

**I claim:**

- 1           1.       A water-based drilling fluid having effective rheology comprising low  
2 shear rate viscosity and effective fluid loss control properties comprising:  
3           a quantity of water soluble polymer; and,  
4           an amount of surfactant adapted to associate with said water soluble polymer  
5                   and to provide said effective rheology and effective fluid loss control  
6                   properties.
- 1           2.       The water-based drilling fluid of claim 1 wherein said low shear rate  
2 viscosity is about 70,000 cP or more upon exposure to 0.3 rpm.
- 1           3.       The water-based drilling fluid of claim 1 wherein said low shear rate  
2 viscosity is about 100,000 cP or more upon exposure to 0.3 rpm.
- 1           4.       The water-based drilling fluid of claim 1 further comprising a  
2 concentration of non-toxic water emulsifiable material as an internal phase, said  
3 quantity being sufficient to provide effective lubrication properties to said drilling  
4 fluid.
- 1           5.       The water-based drilling fluid of claim 2 further comprising a  
2 concentration of non-toxic water emulsifiable material as an internal phase, said  
3 quantity being sufficient to provide effective lubrication properties to said drilling  
4 fluid.
- 1           6.       The water-based drilling fluid of claim 3 further comprising a  
2 concentration of non-toxic water emulsifiable material as an internal phase, said  
3 quantity being sufficient to provide effective lubrication properties to said drilling  
4 fluid.

1           7.       The water-based drilling fluid of claim 1 wherein said surfactant is  
2 selected from the group consisting of alkyl sulfates, alkyl ether sulfates, alkyl ether  
3 sulfates, alkyl sulfonates, ethoxylated esters, ethoxylated glycoside esters, alcohol  
4 ethers, and phosphated esters comprising about 8 to about 18 carbon atoms, preferably  
5 about 8 to about 12 carbon atoms, alkali metal salts thereof, and combinations thereof.

1           8.       The water-based drilling fluid of claim 1 wherein said surfactant is  
2 selected from the group consisting of alkyl sulfates and alkyl ether sulfates.

1           9.       The water-based drilling fluid of claim 1 wherein said surfactant  
2 comprises an alkyl ether sulfate.

1           10.      The water-based drilling fluid of claim 1 wherein said surfactant is  
2 sodium tridecyl ether sulfate.

1           11.      The water-based drilling fluid of claim 3 wherein said surfactant is  
2 selected from the group consisting of alkyl sulfates, alkyl ether sulfates, alkyl  
3 sulfonates, ethoxylated esters, ethoxylated glycoside esters, alcohol ethers, and  
4 phosphated esters comprising about 8 to about 18 carbon atoms, preferably about 8 to  
5 about 12 carbon atoms, alkali metal salts thereof, and combinations thereof.

1           12.      The water-based drilling fluid of claim 3 wherein said surfactant is  
2 selected from the group consisting of alkyl sulfates and alkyl ether sulfates.

1           13.      The water-based drilling fluid of claim 3 wherein said surfactant  
2 comprises an alkyl ether sulfate.

1           14.      The water-based drilling fluid of claim 3 wherein said surfactant is  
2 sodium tridecyl ether sulfate.

1           15.      The water-based drilling fluid of claim 4 wherein said surfactant is  
2 selected from the group consisting of alkyl sulfates, alkyl ether sulfates, alkyl





1           35.     The water-based drilling fluid of claim 27 wherein said effective fluid  
2     loss control properties is a fluid loss of about 5 ml./30 min. or less using the standard  
3     dynamic filtration fluid loss test.

1           36.     The water-based drilling fluid of claim 28 wherein said effective fluid  
2     loss control properties is a fluid loss of about 5 ml./30 min. or less using the standard  
3     dynamic filtration fluid loss test.

1           37.     The water-based drilling fluid of claim 29 wherein said effective fluid  
2     loss control properties is a fluid loss of about 5 ml./30 min. or less using the standard  
3     dynamic filtration fluid loss test.

1           38.     The water-based drilling fluid of claim 30 wherein said effective fluid  
2     loss control properties is a fluid loss of about 5 ml./30 min. or less using the standard  
3     dynamic filtration fluid loss test.

1           39.     The water-based drilling fluid of claim 30 wherein said effective fluid  
2     loss control properties is a fluid loss of about 1 ml./30 min. or less using the standard  
3     dynamic filtration fluid loss test.

1           40.     A water-based drilling fluid having effective rheology comprising low  
2     shear rate viscosity and effective fluid loss control properties comprising:

3                 a quantity of water soluble polymer;

4                 an amount of surfactant adapted to associate with said water soluble polymer

5                         and to provide said effective rheology and effective fluid loss control  
6                         properties; and

7                 a concentration of non-toxic water emulsifiable material as an internal phase,

8                         said surfactant being effective to emulsify said water emulsifiable

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9 material and to produce emulsion droplets having an average diameter  
10 of about 30 microns or less.

1 41. The water-based drilling fluid of claim 40 wherein said surfactant is  
2 selected from the group consisting of alkyl sulfates, alkyl ether sulfates, alkyl  
3 sulfonates, ethoxylated esters, ethoxylated glycoside esters, alcohol ethers, and  
4 phosphated esters comprising about 8 to about 18 carbon atoms, preferably about 8 to  
5 about 12 carbon atoms, alkali metal salts thereof, and combinations thereof.

1 42. The water-based drilling fluid of claim 40 wherein said surfactant is  
2 selected from the group consisting of alkyl sulfates and alkyl ether sulfates.

1 43. The water-based drilling fluid of claim 40 wherein said surfactant  
2 comprises an alkyl ether sulfate.

1 44. The water-based drilling fluid of claim 40 wherein said surfactant is  
2 sodium tridecyl ether sulfate.

1 45. The water-based drilling fluid of claim 40 wherein said surfactant is  
2 effective to emulsify said water emulsifiable material and to produce emulsion  
3 droplets having an average diameter of about 20 microns or less.

1 46. The water-based drilling fluid of claim 40 wherein said surfactant is  
2 effective to emulsify said water emulsifiable material and to produce emulsion  
3 droplets having an average diameter of about 15 microns or less.

1 47. The water-based drilling fluid of claim 40 wherein said surfactant is  
2 effective to emulsify said water emulsifiable material and to produce emulsion  
3 droplets having an average diameter of about 5 microns or less.

1 48. The water-based drilling fluid of claim 40 wherein said low shear rate  
2 viscosity is about 70,000 cP or more upon exposure to 0.3 rpm.

1           49.     The water-based drilling fluid of claim 40 wherein said low shear rate  
2 viscosity is about 100,000 cP or more upon exposure to 0.3 rpm.

1           50.     The water-based drilling fluid of claim 47 wherein said low shear rate  
2 viscosity is about 70,000 cP or more upon exposure to 0.3 rpm.

1           51.     The water-based drilling fluid of claim 40 wherein said concentration  
2 is from about 2 to about 20 vol.%.

1           52.     The water-based drilling fluid of claim 40 wherein said concentration  
2 is about 5 vol.% .

1           53.     The water-based drilling fluid of claim 47 wherein said concentration  
2 is from about 2 to about 20 vol.%.

1           54.     The water-based drilling fluid of claim 47 wherein said concentration  
2 is about 5 vol.% .

1           55.     The water-based drilling fluid of claim 40 wherein said non-toxic  
2 water emulsifiable material is a water insoluble material selected from the group  
3 consisting of olefins, paraffins, water insoluble glycols, water insoluble esters, water  
4 insoluble Fischer-Tropsch reaction products, and combinations thereof.

1           56.     The water-based drilling fluid of claim 40 wherein said water  
2 emulsifiable material is a water insoluble material selected from the group consisting  
3 of olefins, paraffins, water insoluble glycols, and combinations thereof.

1           57.     The water-based drilling fluid of claim 47 wherein said water  
2 emulsifiable material is a water insoluble material selected from the group consisting  
3 of olefins, paraffins, water insoluble glycols, and combinations thereof.

1           58.     The water-based drilling fluid of claim 40 wherein said fluid consists  
2 essentially of additives other a solid bridging agent.

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1           59.     The water-based drilling fluid of claim 48 wherein said fluid consists  
2 essentially of additives other than a solid bridging agent.

1           60.     The water-based drilling fluid of claim 49 wherein said fluid consists  
2 essentially of additives other than a solid bridging agent.

1           61.     The water-based drilling fluid of claim 50 wherein said fluid consists  
2 essentially of additives other than a solid bridging agent.

1           62.     The water-based drilling fluid of claim 40 wherein said effective fluid  
2 loss control properties is a fluid loss of about 5 ml./30 min. or less using the standard  
3 dynamic filtration fluid loss test.

1           63.     The water-based drilling fluid of claim 58 wherein said effective fluid  
2 loss control properties is a fluid loss of about 5 ml./30 min. or less using the standard  
3 dynamic filtration fluid loss test.

1           64.     The water-based drilling fluid of claim 59 wherein said effective fluid  
2 loss control properties is a fluid loss of about 5 ml./30 min. or less using the standard  
3 dynamic filtration fluid loss test.

1           65.     The water-based drilling fluid of claim 60 wherein said effective fluid  
2 loss control properties is a fluid loss of about 5 ml./30 min. or less using the standard  
3 dynamic filtration fluid loss test.

1           66.     The water-based drilling fluid of claim 61 wherein said effective fluid  
2 loss control properties is a fluid loss of about 1 ml./30 min. or less using the standard  
3 dynamic filtration fluid loss test.

1           67.     The water-based drilling fluid of claim 40 wherein said water soluble  
2 polymer is selected from the group consisting of water soluble starches and modified  
3 versions thereof, water-soluble polysaccharides and modified versions thereof, and



4 water-soluble celluloses and modified versions thereof, and water soluble  
5 polyacrylamides and copolymers thereof, and combinations thereof.

1 68. The water-based drilling fluid of claim 40 wherein said quantity is at  
2 least about 2 lb./bbl.

1 69. The water-based drilling fluid of claim 40 wherein said quantity is  
2 about 7.5 lb.bbl.

1 70. The water-based drilling fluid of claim 48 wherein said water soluble  
2 polymer is selected from the group consisting of water soluble starches and modified  
3 versions thereof, water-soluble polysaccharides and modified versions thereof, and  
4 water-soluble celluloses and modified versions thereof, and water soluble  
5 polyacrylamides and copolymers thereof, and combinations thereof.

1 71. The water-based drilling fluid of claim 48 wherein said quantity is at  
2 least about 2 lb./bbl.

1 72. The water-based drilling fluid of claim 48 wherein said quantity is  
2 about 7.5 lb.bbl.

1 73. The water-based drilling fluid of claim 59 wherein said water soluble  
2 polymer is selected from the group consisting of water soluble starches and modified  
3 versions thereof, water-soluble polysaccharides and modified versions thereof, and  
4 water-soluble celluloses and modified versions thereof, and water soluble  
5 polyacrylamides and copolymers thereof, and combinations thereof.

1 74. The water-based drilling fluid of claim 59 wherein said quantity is at  
2 least about 2 lb./bbl.

1 75. The water-based drilling fluid of claim 59 wherein said quantity is  
2 about 7.5 lb.bbl.

1           76.    The water based drilling fluid of claim 40 wherein said amount is from  
2   about 0.2 to about 4 lb./bbl.

1           77.    The water based drilling fluid of claim 40 wherein said amount is  
2   about 2 lb./bbl.

1           78.    The water-based drilling fluid of claim 40 wherein said quantity is at  
2   least about 2 lb./bbl.

1           79.    The water-based drilling fluid of claim 40 wherein said quantity is  
2   about 7.5 lb.bbl.

1           80.    The water based drilling fluid of claim 58 wherein said amount is from  
2   about 0.2 to about 4 lb./bbl.

1           81.    The water based drilling fluid of claim 58 wherein said amount is  
2   about 2 lb./bbl.

1           82.    A water-based drilling fluid having effective rheology with low shear  
2   rate viscosity and effective fluid loss control properties comprising:

3                at least about 2 lb./bbl. water soluble polymer; and,

4                at least about 0.2 lb./bbl. of a surfactant adapted to associate with said water  
5                soluble polymer and to provide said effective rheology and fluid loss  
6                control properties.

1           83.    The water-based drilling fluid of claim 82 wherein said surfactant is  
2   selected from the group consisting of alkyl sulfates, alkyl ether sulfates, alkyl  
3   sulfonates, ethoxylated esters, ethoxylated glycoside esters, alcohol ethers, and  
4   phosphated esters comprising about 8 to about 18 carbon atoms, preferably about 8 to  
5   about 12 carbon atoms, alkali metal salts thereof, and combinations thereof.

1           84.     The water-based drilling fluid of claim 82 wherein said surfactant is  
2 selected from the group consisting of alkyl sulfates and alkyl ether sulfates.

1           85.     The water-based drilling fluid of claim 82 wherein said surfactant  
2 comprises an alkyl ether sulfate.

1           86.     The water-based drilling fluid of claim 82 wherein said surfactant is  
2 sodium tridecyl ether sulfate.

1           87.     The water-based drilling fluid of claim 82 wherein said low shear rate  
2 viscosity is about 70,000 cP or more upon exposure to 0.3 rpm.

1           88.     The water-based drilling fluid of claim 82 wherein said low shear rate  
2 viscosity is about 100,000 cP or more upon exposure to 0.3 rpm.

1           89.     The water-based drilling fluid of claim 83 wherein said low shear rate  
2 viscosity is about 70,000 cP or more upon exposure to 0.3 rpm.

1           90.     The water-based drilling fluid of claim 84 wherein said low shear rate  
2 viscosity is about 70,000 cP or more upon exposure to 0.3 rpm.

1           91.     The water-based drilling fluid of claim 85 wherein said low shear rate  
2 viscosity is about 70,000 cP or more upon exposure to 0.3 rpm.

1           92.     The water-based drilling fluid of claim 86 wherein said low shear rate  
2 viscosity is about 70,000 cP or more upon exposure to 0.3 rpm.

1           93.     The water-based drilling fluid of claim 82 further comprising a  
2 concentration of non-toxic water emulsifiable material as an internal phase.

1           94.     The water-based drilling fluid of claim 83 further comprising a  
2 concentration of non-toxic water emulsifiable material as an internal phase.

1           95.     The water-based drilling fluid of claim 84 further comprising a  
2 concentration of non-toxic water emulsifiable material as an internal phase.

1           96.    The water-based drilling fluid of claim 85 further comprising a  
2 concentration of non-toxic water emulsifiable material as an internal phase.

1           97.    The water-based drilling fluid of claim 88 further comprising a  
2 concentration of non-toxic water emulsifiable material as an internal phase.

1           98.    The water-based drilling fluid of claim 89 further comprising a  
2 concentration of non-toxic water emulsifiable material as an internal phase.

1           99.    The water-based drilling fluid of claim 90 further comprising a  
2 concentration of non-toxic water emulsifiable material as an internal phase.

1           100.   The water-based drilling fluid of claim 91 further comprising a  
2 concentration of non-toxic water emulsifiable material as an internal phase.

1           101.   The water-based drilling fluid of claim 93 wherein said concentration  
2 is from about 2 to about 20 vol.%.

1           102.   The water-based drilling fluid of claim 93 wherein said concentration  
2 is about 5 vol.% .

1           103.   The water-based drilling fluid of claim 97 wherein said concentration  
2 is from about 2 to about 20 vol.%.

1           104.   The water-based drilling fluid of claim 97 wherein said concentration  
2 is about 5 vol.% .

1           105.   The water-based drilling fluid of claim 100 wherein said concentration  
2 is from about 2 to about 20 vol.%.

1           106.   The water-based drilling fluid of claim 100 wherein said concentration  
2 is about 5 vol.% .

1           107.   The water-based drilling fluid of claim 88 wherein said fluid consists  
2 essentially of additives other a solid bridging agent.

1           108.   The water-based drilling fluid of claim 87 wherein said fluid consists  
2 essentially of additives other than a solid bridging agent.

1           109.   The water-based drilling fluid of claim 88 wherein said fluid consists  
2 essentially of additives other than a solid bridging agent.

1           110.   The water-based drilling fluid of claim 89 wherein said fluid consists  
2 essentially of additives other than a solid bridging agent.

1           111.   The water-based drilling fluid of claim 90 wherein said fluid consists  
2 essentially of additives other than a solid bridging agent.

1           112.   The water-based drilling fluid of claim 91 wherein said fluid consists  
2 essentially of additives other than a solid bridging agent.

1           113.   The water-based drilling fluid of claim 92 wherein said fluid consists  
2 essentially of additives other than a solid bridging agent.

1           114.   The water-based drilling fluid of claim 107 wherein said effective fluid  
2 loss control properties is a fluid loss of about 5 ml./30 min. or less using the standard  
3 dynamic filtration fluid loss test.

1           115.   The water-based drilling fluid of claim 108 wherein said effective fluid  
2 loss control properties is a fluid loss of about 5 ml./30 min. or less using the standard  
3 dynamic filtration fluid loss test.

1           116.   The water-based drilling fluid of claim 109 wherein said effective fluid  
2 loss control properties is a fluid loss of about 5 ml./30 min. or less using the standard  
3 dynamic filtration fluid loss test.

1           117.   The water-based drilling fluid of claim 110 wherein said effective fluid  
2 loss control properties is a fluid loss of about 5 ml./30 min. or less using the standard  
3 dynamic filtration fluid loss test.

1           118.   The water-based drilling fluid of claim 111 wherein said effective fluid  
2   loss control properties is a fluid loss of about 5 ml./30 min. or less using the standard  
3   dynamic filtration fluid loss test.

1           119.   The water-based drilling fluid of claim 112 wherein said effective fluid  
2   loss control properties is a fluid loss of about 5 ml./30 min. or less using the standard  
3   dynamic filtration fluid loss test.

1           120.   The water-based drilling fluid of claim 113 wherein said effective fluid  
2   loss control properties is a fluid loss of about 5 ml./30 min. or less using the standard  
3   dynamic filtration fluid loss test.

1           121.   The water-based drilling fluid of claim 82 wherein said water soluble  
2   polymer is selected from the group consisting of water soluble starches and modified  
3   versions thereof, water-soluble polysaccharides and modified versions thereof, and  
4   water-soluble celluloses and modified versions thereof, and water soluble  
5   polyacrylamides and copolymers thereof, and combinations thereof.

1           122.   The water-based drilling fluid of claim 82 wherein said quantity is at  
2   least about 2 lb./bbl.

1           123.   The water-based drilling fluid of claim 82 wherein said quantity is  
2   about 7.5 lb.bbl.

1           124.   The water-based drilling fluid of claim 113 wherein said water soluble  
2   polymer is selected from the group consisting of water soluble starches and modified  
3   versions thereof, water-soluble polysaccharides and modified versions thereof, and  
4   water-soluble celluloses and modified versions thereof, and water soluble  
5   polyacrylamides and copolymers thereof, and combinations thereof.

1           125. The water-based drilling fluid of claim 120 wherein said water soluble  
2 polymer is selected from the group consisting of water soluble starches and modified  
3 versions thereof, water-soluble polysaccharides and modified versions thereof, and  
4 water-soluble celluloses and modified versions thereof, and water soluble  
5 polyacrylamides and copolymers thereof, and combinations thereof.

1           126. A water-based drilling fluid having effective rheology comprising low  
2 shear rate viscosity and effective fluid loss control properties comprising:  
3           about 7.5 lb./bbl. water soluble polymer; and,  
4           about 2 lb./bbl. of a surfactant adapted to associate with said water soluble  
5           polymer and to provide said effective rheology and fluid loss control  
6           properties.

1           127. The water-based drilling fluid of claim 126 further comprising a  
2 concentration of a water emulsifiable material as an internal phase.

1           128. The water-based drilling fluid of claim 126 wherein said surfactant is  
2 selected from the group consisting of alkyl sulfates, alkyl ether sulfates, alkyl  
3 sulfonates, ethoxylated esters, ethoxylated glycoside esters, alcohol ethers, and  
4 phosphated esters comprising about 8 to about 18 carbon atoms, preferably about 8 to  
5 about 12 carbon atoms, alkali metal salts thereof, and combinations thereof.

1           129. The water-based drilling fluid of claim 126 wherein said surfactant is  
2 selected from the group consisting of alkyl sulfates and alkyl ether sulfates.

1           130. The water-based drilling fluid of claim 126 wherein said surfactant  
2 comprises an alkyl ether sulfate.

1           131. The water-based drilling fluid of claim 126 wherein said surfactant is  
2 sodium tridecyl ether sulfate.

1           132.   The water-based drilling fluid of claim 127 wherein said surfactant is  
2   selected from the group consisting of alkyl sulfates, alkyl ether sulfates, alkyl  
3   sulfonates, ethoxylated esters, ethoxylated glycoside esters, alcohol ethers, and  
4   phosphated esters comprising about 8 to about 18 carbon atoms, preferably about 8 to  
5   about 12 carbon atoms, alkali metal salts thereof, and combinations thereof.

1           133.   The water-based drilling fluid of claim 127 wherein said surfactant is  
2   selected from the group consisting of alkyl sulfates and alkyl ether sulfates

1           134.   The water-based drilling fluid of claim 127 wherein said surfactant  
2   comprises an alkyl ether sulfate.

1           135.   The water-based drilling fluid of claim 127 wherein said surfactant is  
2   sodium tridecyl ether sulfate.

1           136.   The water-based drilling fluid of claim 126 wherein said water soluble  
2   polymer is selected from the group consisting of water soluble starches and modified  
3   versions thereof, water-soluble polysaccharides and modified versions thereof, and  
4   water-soluble celluloses and modified versions thereof, and water soluble  
5   polyacrylamides and copolymers thereof, and combinations thereof.

1           137.   The water-based drilling fluid of claim 127 wherein said water soluble  
2   polymer is selected from the group consisting of water soluble starches and modified  
3   versions thereof, water-soluble polysaccharides and modified versions thereof, and  
4   water-soluble celluloses and modified versions thereof, and water soluble  
5   polyacrylamides and copolymers thereof, and combinations thereof.

1           138.   The water-based drilling fluid of claim 134 wherein said water soluble  
2   polymer is selected from the group consisting of water soluble starches and modified



3 versions thereof, water-soluble polysaccharides and modified versions thereof, and  
4 water-soluble celluloses and modified versions thereof, and water soluble  
5 polyacrylamides and copolymers thereof, and combinations thereof.

1 139. The water-based drilling fluid of claim 135 wherein said water soluble  
2 polymer is selected from the group consisting of water soluble starches and modified  
3 versions thereof, water-soluble polysaccharides and modified versions thereof, and  
4 water-soluble celluloses and modified versions thereof, and water soluble  
5 polyacrylamides and copolymers thereof, and combinations thereof.

1 140. The water-based drilling fluid of claim 126 wherein said low shear rate  
2 viscosity is about 70,000 cP or more upon exposure to 0.3 rpm.

1 141. The water-based drilling fluid of claim 126 wherein said low shear rate  
2 viscosity is about 100,000 cP or more upon exposure to 0.3 rpm.

1 142. The water-based drilling fluid of claim 126 wherein said low shear rate  
2 viscosity is about 200,000 cP or more upon exposure to 0.3 rpm.

1 143. The water-based drilling fluid of claim 127 wherein said low shear rate  
2 viscosity is about 70,000 cP or more upon exposure to 0.3 rpm.

1 144. The water-based drilling fluid of claim 127 wherein said low shear rate  
2 viscosity is about 100,000 cP or more upon exposure to 0.3 rpm.

1 145. The water-based drilling fluid of claim 140 wherein said fluid consists  
2 essentially of additives other than a solid bridging agent.

1 146. The water-based drilling fluid of claim 141 wherein said fluid consists  
2 essentially of additives other than a solid bridging agent.

1 147. The water-based drilling fluid of claim 142 wherein said fluid consists  
2 essentially of additives other than a solid bridging agent.

1           148.   The water-based drilling fluid of claim 143 wherein said fluid consists  
2 essentially of additives other than a solid bridging agent.

1           149.   The water-based drilling fluid of claim 144 wherein said fluid consists  
2 essentially of additives other than a solid bridging agent.

1           150.   The water-based drilling fluid of claim 145 wherein said effective fluid  
2 loss control properties is a fluid loss of about 5 ml./30 min. or less using the standard  
3 dynamic filtration fluid loss test.

1           151.   The water-based drilling fluid of claim 146 wherein said effective fluid  
2 loss control properties is a fluid loss of about 5 ml./30 min. or less using the standard  
3 dynamic filtration fluid loss test.

1           152.   The water-based drilling fluid of claim 147 wherein said effective fluid  
2 loss control properties is a fluid loss of about 5 ml./30 min. or less using the standard  
3 dynamic filtration fluid loss test.

1           153.   The water-based drilling fluid of claim 148 wherein said effective fluid  
2 loss control properties is a fluid loss of about 5 ml./30 min. or less using the standard  
3 dynamic filtration fluid loss test.

1           154.   The water-based drilling fluid of claim 149 wherein said effective fluid  
2 loss control properties is a fluid loss of about 5 ml./30 min. or less using the standard  
3 dynamic filtration fluid loss test.

1           155.   The water-based drilling fluid of claim 154 wherein said non-toxic  
2 water emulsifiable material is a water insoluble material selected from the group  
3 consisting of olefins, paraffins, water insoluble glycols, and combinations thereof.

1           156. A water-based drilling fluid having effective rheology comprising low  
2 shear rate viscosity and effective fluid loss control properties, and consisting  
3 essentially of additives other than solid bridging agents, said drilling fluid comprising:  
4           about 7.5 lb./bbl. water soluble polymer;  
5           about 2 lb./bbl. of a surfactant adapted to associate with said water soluble  
6           polymer and to provide said effective rheology and fluid loss control  
7           properties; and  
8           a concentration of a non-toxic water emulsifiable material as an internal  
9           phase.

1           157. The water-based drilling fluid of claim 156 wherein said surfactant is  
2 sodium tridecyl ether sulfate.

1           158. The water-based drilling fluid of claim 156 wherein said water soluble  
2 polymer is selected from the group consisting of water soluble starches and modified  
3 versions thereof, water-soluble polysaccharides and modified versions thereof, and  
4 water-soluble celluloses and modified versions thereof, and water soluble  
5 polyacrylamides and copolymers thereof, and combinations thereof.

1           159. The water-based drilling fluid of claim 157 wherein said water soluble  
2 polymer is selected from the group consisting of water soluble starches and modified  
3 versions thereof, water-soluble polysaccharides and modified versions thereof, and  
4 water-soluble celluloses and modified versions thereof, and water soluble  
5 polyacrylamides and copolymers thereof, and combinations thereof.

1           160. The water-based drilling fluid of claim 156 wherein said water soluble  
2 polymer is a combination comprising from about 40 to about 60 wt.% of a xanthan  
3 polysaccharide and about from about 40 to about 60 wt.% synthetically modified



1           165.   The water-based drilling fluid of claim 156 wherein said non-toxic  
2 water emulsifiable material is a water insoluble material selected from the group  
3 consisting of olefins, paraffins, water insoluble glycols, and combinations thereof.

1           166.   The water-based drilling fluid of claim 163 wherein said non-toxic  
2 water emulsifiable material is a water insoluble material selected from the group  
3 consisting of olefins, paraffins, water insoluble glycols, and combinations thereof.

1           167.   The water-based drilling fluid of claim 1 further comprising an alkali  
2 metal salt of a compound selected from the group consisting of a thiosulfate and a  
3 thiosulfonate.

1           168.   The water-based drilling fluid of claim 40 further comprising an alkali  
2 metal salt of a compound selected from the group consisting of a thiosulfate and a  
3 thiosulfonate.

1           169.   The water-based drilling fluid of claim 82 further comprising an alkali  
2 metal salt of a compound selected from the group consisting of a thiosulfate and a  
3 thiosulfonate.

1           170.   The water-based drilling fluid of claim 125 further comprising an  
2 alkali metal salt of a compound selected from the group consisting of a thiosulfate and  
3 a thiosulfonate.

1           171.   The water-based drilling fluid of claim 156 further comprising an  
2 alkali metal salt of a compound selected from the group consisting of a thiosulfate and  
3 a thiosulfonate.

1           172.   The water-based drilling fluid of claim 162 further comprising an  
2 alkali metal salt of a compound selected from the group consisting of a thiosulfate and  
3 a thiosulfonate.

1           173.   The water-based drilling fluid of claim 126 further comprising an  
2 alkali metal salt of a compound selected from the group consisting of a thiosulfate and  
3 a thiosulfonate.

1           174.   The water-based drilling fluid of claim 1 wherein said water soluble  
2 polymer is a combination comprising from about 40 to about 60 wt.% of a xanthan  
3 polysaccharide and about from about 40 to about 60 wt.% synthetically modified  
4 starch comprising one or more functional groups selected from the group consisting of  
5 carboxymethyl, propylene glycol, and epichlorohydrin functional groups.

1           175.   The water-based drilling fluid of claim 1 wherein said water soluble  
2 polymer is a combination comprising about 50 wt.% xanthan polysaccharide and  
3 about 50 wt.% synthetically modified starch comprising one or more functional  
4 groups selected from the group consisting of carboxymethyl, propylene glycol, and  
5 epichlorohydrin functional groups.

1           176.   The water-based drilling fluid of claim 2 wherein said water soluble  
2 polymer is a combination comprising from about 40 to about 60 wt.% of a xanthan  
3 polysaccharide and about from about 40 to about 60 wt.% synthetically modified  
4 starch comprising one or more functional groups selected from the group consisting of  
5 carboxymethyl, propylene glycol, and epichlorohydrin functional groups.

1           177.   The water-based drilling fluid of claim 2 wherein said water soluble  
2 polymer is a combination comprising about 50 wt.% xanthan polysaccharide and  
3 about 50 wt.% synthetically modified starch comprising one or more functional  
4 groups selected from the group consisting of carboxymethyl, propylene glycol, and  
5 epichlorohydrin functional groups.

1           178. The water-based drilling fluid of claim 6 wherein said water soluble  
2 polymer is a combination comprising from about 40 to about 60 wt.% of a xanthan  
3 polysaccharide and about from about 40 to about 60 wt.% synthetically modified  
4 starch comprising one or more functional groups selected from the group consisting of  
5 carboxymethyl, propylene glycol, and epichlorohydrin functional groups.

1           179. The water-based drilling fluid of claim 6 wherein said water soluble  
2 polymer is a combination comprising about 50 wt.% xanthan polysaccharide and  
3 about 50 wt.% synthetically modified starch comprising one or more functional  
4 groups selected from the group consisting of carboxymethyl, propylene glycol, and  
5 epichlorohydrin functional groups.

1           180. The water-based drilling fluid of claim 10 wherein said water soluble  
2 polymer is a combination comprising from about 40 to about 60 wt.% of a xanthan  
3 polysaccharide and about from about 40 to about 60 wt.% synthetically modified  
4 starch comprising one or more functional groups selected from the group consisting of  
5 carboxymethyl, propylene glycol, and epichlorohydrin functional groups.

1           181. The water-based drilling fluid of claim 10 wherein said water soluble  
2 polymer is a combination comprising about 50 wt.% xanthan polysaccharide and  
3 about 50 wt.% synthetically modified starch comprising one or more functional  
4 groups selected from the group consisting of carboxymethyl, propylene glycol, and  
5 epichlorohydrin functional groups.

1           182. The water-based drilling fluid of claim 40 wherein said water soluble  
2 polymer is a combination comprising from about 40 to about 60 wt.% of a xanthan  
3 polysaccharide and about from about 40 to about 60 wt.% synthetically modified

4 starch comprising one or more functional groups selected from the group consisting of  
5 carboxymethyl, propylene glycol, and epichlorohydrin functional groups.

1 183. The water-based drilling fluid of claim 40 wherein said water soluble  
2 polymer is a combination comprising about 50 wt.% xanthan polysaccharide and  
3 about 50 wt.% synthetically modified starch comprising one or more functional  
4 groups selected from the group consisting of carboxymethyl, propylene glycol, and  
5 epichlorohydrin functional groups.

1 184. The water-based drilling fluid of claim 82 wherein said water soluble  
2 polymer is a combination comprising from about 40 to about 60 wt.% of a xanthan  
3 polysaccharide and about from about 40 to about 60 wt.% synthetically modified  
4 starch comprising one or more functional groups selected from the group consisting of  
5 carboxymethyl, propylene glycol, and epichlorohydrin functional groups.

1 185. The water-based drilling fluid of claim 82 wherein said water soluble  
2 polymer is a combination comprising about 50 wt.% xanthan polysaccharide and  
3 about 50 wt.% synthetically modified starch comprising one or more functional  
4 groups selected from the group consisting of carboxymethyl, propylene glycol, and  
5 epichlorohydrin functional groups.

1 186. The water-based drilling fluid of claim 126 wherein said water soluble  
2 polymer is a combination comprising from about 40 to about 60 wt.% of a xanthan  
3 polysaccharide and about from about 40 to about 60 wt.% synthetically modified  
4 starch comprising one or more functional groups selected from the group consisting of  
5 carboxymethyl, propylene glycol, and epichlorohydrin functional groups.

1 187. The water-based drilling fluid of claim 126 wherein said water soluble  
2 polymer is a combination comprising about 50 wt.% xanthan polysaccharide and



3 about 50 wt.% synthetically modified starch comprising one or more functional  
4 groups selected from the group consisting of carboxymethyl, propylene glycol, and  
5 epichlorohydrin functional groups.

1 188. The water-based drilling fluid of claim 156 wherein said water soluble  
2 polymer is a combination comprising from about 40 to about 60 wt.% of a xanthan  
3 polysaccharide and about from about 40 to about 60 wt.% synthetically modified  
4 starch comprising one or more functional groups selected from the group consisting of  
5 carboxymethyl, propylene glycol, and epichlorohydrin functional groups.

1 189. The water-based drilling fluid of claim 156 wherein said water soluble  
2 polymer is a combination comprising about 50 wt.% xanthan polysaccharide and  
3 about 50 wt.% synthetically modified starch comprising one or more functional  
4 groups selected from the group consisting of carboxymethyl, propylene glycol, and  
5 epichlorohydrin functional groups.

1 190. The water-based drilling fluid of claim 162 wherein said water soluble  
2 polymer is a combination comprising from about 40 to about 60 wt.% of a xanthan  
3 polysaccharide and about from about 40 to about 60 wt.% synthetically modified  
4 starch comprising one or more functional groups selected from the group consisting of  
5 carboxymethyl, propylene glycol, and epichlorohydrin functional groups.

1 191. The water-based drilling fluid of claim 162 wherein said water soluble  
2 polymer is a combination comprising about 50 wt.% xanthan polysaccharide and  
3 about 50 wt.% synthetically modified starch comprising one or more functional  
4 groups selected from the group consisting of carboxymethyl, propylene glycol, and  
5 epichlorohydrin functional groups.

1           192. The water-based drilling fluid of claim 163 wherein said water soluble  
2 polymer is a combination comprising about 50 wt.% xanthan polysaccharide and  
3 about 50 wt.% synthetically modified starch comprising one or more functional  
4 groups selected from the group consisting of carboxymethyl, propylene glycol, and  
5 epichlorohydrin functional groups.

1           193. The water-based drilling fluid of claim 164 wherein said water soluble  
2 polymer is a combination comprising about 50 wt.% xanthan polysaccharide and  
3 about 50 wt.% synthetically modified starch comprising one or more functional  
4 groups selected from the group consisting of carboxymethyl, propylene glycol, and  
5 epichlorohydrin functional groups.

1           194. The water-based drilling fluid of claim 165 wherein said water soluble  
2 polymer is a combination comprising about 50 wt.% xanthan polysaccharide and  
3 about 50 wt.% synthetically modified starch comprising one or more functional  
4 groups selected from the group consisting of carboxymethyl, propylene glycol, and  
5 epichlorohydrin functional groups.

1           195. The water-based drilling fluid of claim 166 wherein said water soluble  
2 polymer is a combination comprising about 50 wt.% xanthan polysaccharide and  
3 about 50 wt.% synthetically modified starch comprising one or more functional  
4 groups selected from the group consisting of carboxymethyl, propylene glycol, and  
5 epichlorohydrin functional groups.